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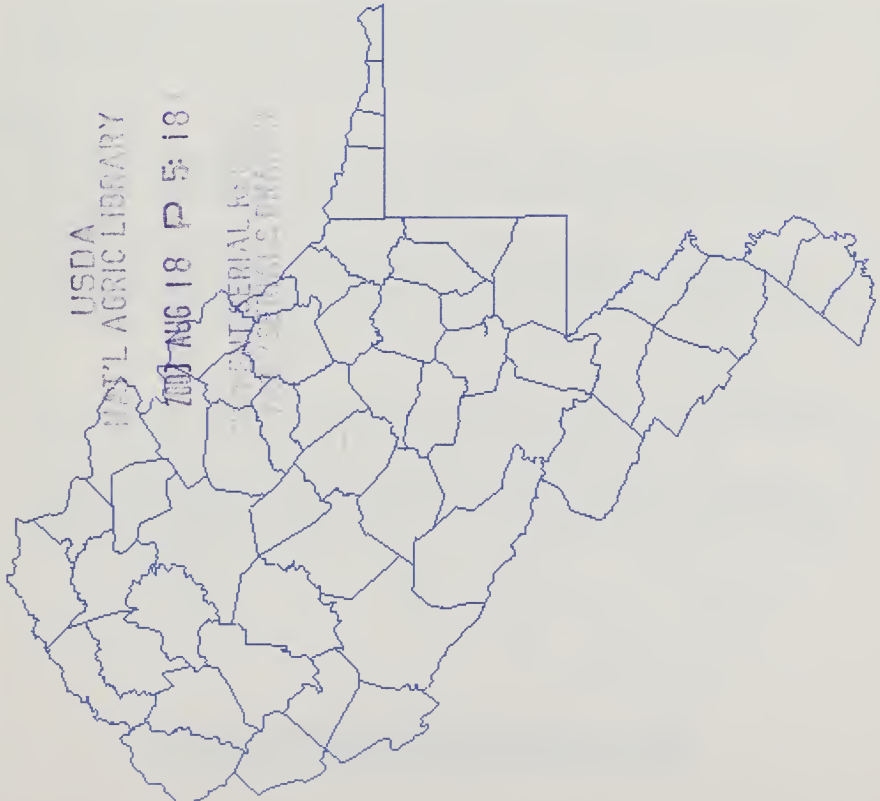
Forest Service

Northeastern
Research Station

NE-INF-159-02



Forest Health Monitoring in West Virginia 1996-1999



WEST VIRGINIA

The National Forest Health Monitoring (FHM) program monitors the long-term status, changes and trends in the health of forest ecosystems and is conducted in cooperation with individual states.

In West Virginia, 96 FHM plots were established in 1995 (Fig. 1). Each point in Figure 1 represents the status and approximate location of one FHM plot. (These points are actually the centers of hexagonally shaped cells. Since one FHM plot was established within each cell, but not necessarily at the center, cell centers may not be located in the same state as the plot.) Each plot is a set of four fixed-area circular plots. Most tree measurements are made on four 1/24-acre subplots. Seedling and sapling measurements are made on four 1/300-acre microplots, located within the subplots.

All plots were visited in 1996 and 1997. In 1998 and 1999, most plots in were revisited on a rotating schedule with about one-third of the plots sampled each year. This report summarizes the most recent conditions.

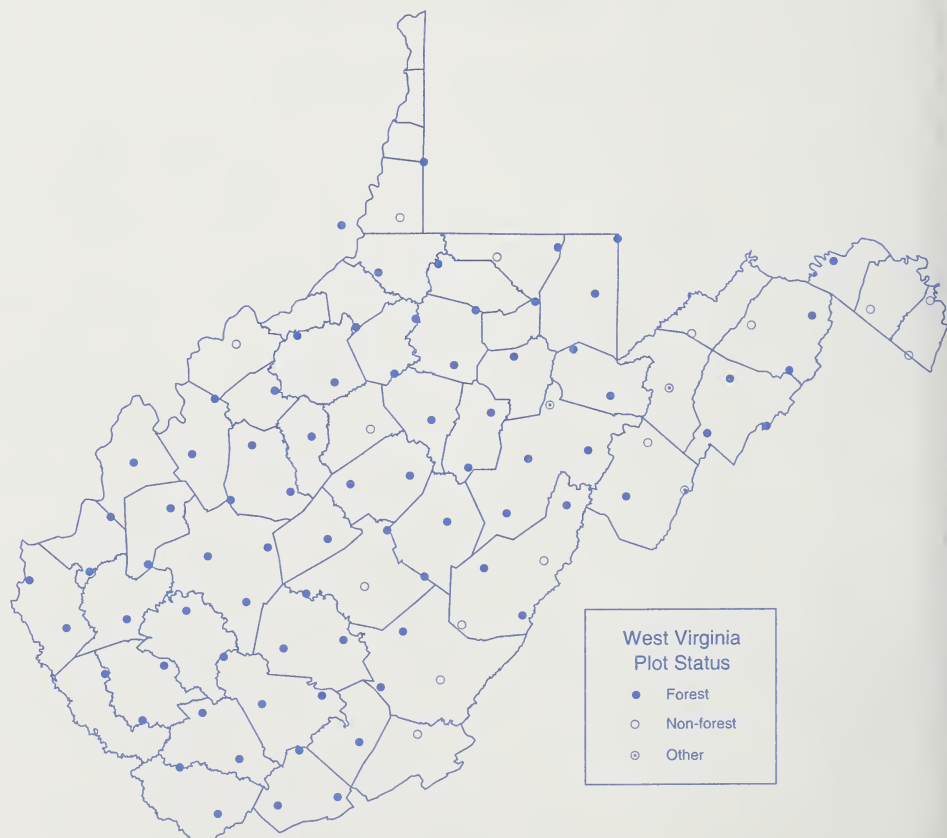


Figure 1.--Current status and approximate locations of Forest Health Monitoring (FHM) plots in West Virginia.

Plot Characteristics

- 78 of the 96 plots were at least partially forested.
- 71 percent of the 96-plot area was forested and accessible.
- 66 percent of the forested areas were of the oak-hickory forest types; the second most common group was the maple-beech-birch forest type, accounting for about 30 percent of the forested areas.
- 73 percent of the forested areas were in sawtimber-size stands; 21 percent were in poletimber-size stands.
- 49 percent of the forested areas were in stands that were more than 60 years old; 32 percent were in stands that were 41 to 60 years old and 13 percent were in stands that were 21 to 40 years old.

Plot Structure (Table 1)

Seedlings

- Red maple seedlings (12 inches tall, less than 1 inch diameter) were most abundant, accounting for about 16 percent of the 1,964 seedlings counted.
- The five most abundant species groups collectively accounted for 46 percent of the seedlings. They were red maple, black cherry, select white oak, sugar maple, and other maple.

Saplings

- Sugar maple saplings (1 to 4.9 inches diameter at breast height, d.b.h.) were the most abundant, accounting for 17 percent of the 342 saplings counted.
- The five most abundant species groups collectively accounted for 49 percent of the saplings. They were sugar maple, red maple, hickory, dogwood, and American beech.

Trees

- Red maple trees (5 inches d.b.h. or greater) were the most abundant, accounting for 14 percent of the 1,442 trees counted.
- The five most common species groups collectively accounted for 48 percent of the trees. They were red maple, yellow-poplar, select white oak, sugar maple, and hickory.

Table 1. -- Number of trees by size class, and species groups, West Virginia, 1996-99. Rankings of species quantity appear as superscripts beside numbers.

Species	Size Class		
	Seedlings	Saplings	Trees
American beech	100	21 ⁵	64
Black cherry	166 ²	1	46
Dogwood	43	26 ⁴	3
Hickory	48	30 ³	111 ⁵
Sugar maple	139 ⁴	57 ¹	115 ³
Red maple	309 ¹	34 ²	197 ¹
Other maple	124 ⁵	16	3
Select white oak	162 ³	7	115 ³
Yellow-poplar	51	14	158 ²
All softwoods	9	13	50
All hardwoods	1,955	329	1,392
All trees	1,964	342	1,442

Table 2. -- Mean plot values and percentage of trees with ratings of specified values, by crown variable, West Virginia, 1996-99. (plot means based on 78 forested plots; percentage of trees based on 1,442 live trees 5 in. or more in d.b.h.)

	Value
<u>Crown Dieback</u>	
Plot Mean	3.3%
Trees with $\leq 5\%$ dieback	94
<u>Foliage Transparency</u>	
Plot Mean	18.4%
Trees with $\leq 30\%$ transparency	98
<u>Crown Density</u>	
Plot Mean	49.4%
Trees with $> 30\%$ density	94

Tree Condition

Crown Dieback (Table 2; Fig. 2)

Crown dieback refers to recent mortality of branches with fine twigs and is measured as a percentage of the tree crown. Low dieback ratings (5 percent or less) are considered to be an indicator of good health. High dieback ratings indicate poor health.

- 94 percent of the trees had low dieback ratings; average dieback was 3 percent.
- Less than 1 percent of the trees had high dieback ratings (more than 20 percent affected crown).

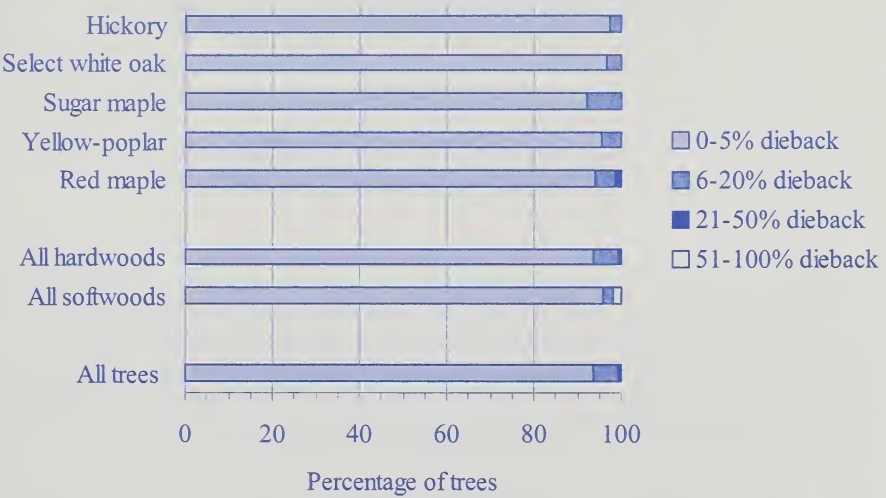


Figure 2. – Distribution of crown dieback ratings for trees in West Virginia, 1996-99.

Foliage Transparency (Table 2; Fig. 3)

Foliage transparency is the amount of skylight visible through the live, normally foliated portion of the crown. Foliage transparency estimates the crown condition in relation to a typical tree for the site where it is found. Low transparency ratings (little visible skylight) indicate a full and generally healthy crown; high transparency ratings indicate a sparse crown. Transparency ratings of 30 percent or less are considered normal for most trees.

- 98 percent of all trees had normal transparency ratings; average transparency was 18 percent.

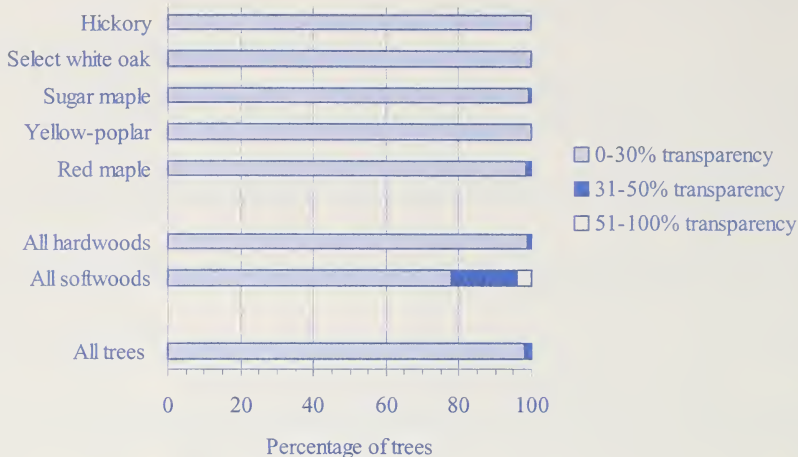


Figure 3.--Distribution of foliage transparency ratings for trees in West Virginia, 1996-99.

Crown Density (Table 2; Fig. 4)

Crown density is the percentage of crown area where sunlight is blocked by crown branches, foliage, and reproductive structures. Crown density estimates crown condition relative to a typical tree for the site. Density also serves as an indicator of future growth. High density ratings (greater than 30 percent) indicate a full, healthy, crown.

- 94 percent of trees had high density ratings; average crown density was 49 percent.
- 98 percent of hickories had high density ratings.



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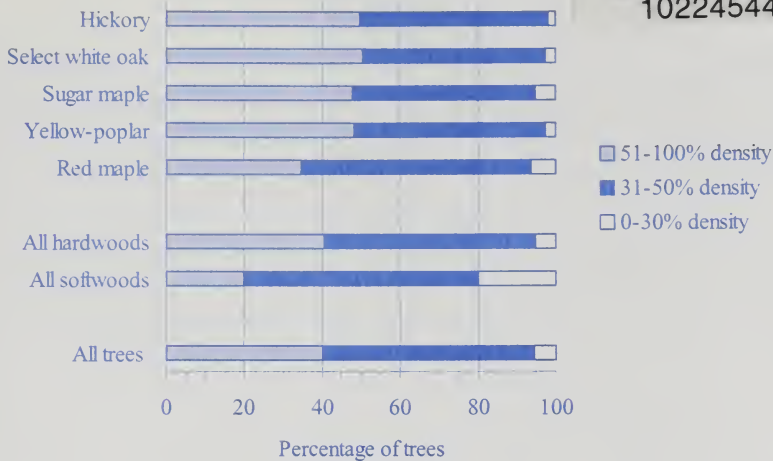
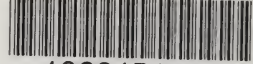


Figure 4. – Distribution of crown density ratings for trees in West Virginia, 1996-99.

Tree Damage

Signs and symptoms of damage were recorded if the damage could kill the tree or affect its long-term survival. The 11 categories of damage used in this report were: cankers and galls, decay, open wounds, resinosis and gummosis, cracks and seams, vines, dead or broken tops, broken branches, other bole and root damage, other crown damage, and other damage (not otherwise defined).

- 75 percent of trees had no significant damage, 21 percent had one damage, and 4 percent of the trees had two or more damages.
- 62 percent of 445 damages on all trees were decay; 10 percent were vines; and 9 percent were dead or broken tops.
- 93 percent of the damage on white oaks, both select and other, was decay.



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Summary

West Virginia has mature forests dominated by hardwood species. Red maple is common in all size classes. Most trees are healthy, with full crowns (low transparency, high density), little dieback and little damage.

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Acknowledgments

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